

CLAIMS

- 1 1. A system for varying the temperature of a wafer comprising:
 - 2 a first temperature controlled plate;
 - 3 a second temperature controlled plate comprising proximity pins, the wafer
 - 4 located between the first and second temperature controlled plates and distanced from
 - 5 the second temperature controlled plate by the proximity pins; and
 - 6 an enclosure surrounding the first and second temperature controlled plates
 - 7 and the wafer, the enclosure comprising a gas input and output, the gas flowing from
 - 8 the input past the wafer and to the output.
- 1 2. The system of claim 1 wherein the first temperature controlled plate further
 - 2 comprises proximity pins, the proximity pins configured to distance the wafer from
 - 3 the first temperature controlled plate.
- 1 3. The system of claim 2 wherein the proximity pins are moveable such that the
 - 2 distance of the first and second temperature controlled plate from the wafer may be
 - 3 varied.
- 1 4. The system of claim 1 further comprising a flow distribution manifold
 - 2 configured to distribute the gas upon the wafer.
- 1 5. The system of claim 4 wherein the flow distribution manifold comprises
 - 2 laminar flow paths, each laminar flow path comprising a laminar flow element
 - 3 controlling the flow rate of said flow path.
- 1 6. The system of claim 5 wherein the laminar flow element comprises a channel
 - 2 formed in a substrate.
- 1 7. The system of claim 5 wherein each of the laminar flow paths further
 - 2 comprise a cavity such that any contaminants or solvents that may be present in the

3 enclosure and that may enter the flow paths will accumulate in the cavity rather than
4 in the laminar flow elements.

1 8. The system of claim 4 wherein the flow distribution manifold is in contact
2 with the first temperature controlled plate, and wherein the gas distributed is at
3 substantially the same temperature as the first temperature controlled plate.

1 9. The system of claim 8 wherein the first temperature control plate comprises
2 flow channels and wherein the gas flows from the manifold and through the channels
3 to the wafer.

1 10. The system of claim 1 further comprising a gas output flow regulator.

1 11. A device for controlling the temperature of a wafer comprising:

2 a temperature control element; and

3 a gas distribution system configured to distribute gas at different points about
4 a surface of the wafer, the gas distribution system comprising a plurality of flow
5 paths, each of the plurality of flow paths comprising a laminar flow element,

6 wherein the wafer is located between the gas distribution system and the
7 temperature control element.

1 12. The device of claim 11 wherein the gas distribution system is temperature
2 controlled thereby providing substantially uniform temperature distribution and gas
3 flow distribution across the surface of the wafer.

1 13. The device of claim 11 further comprising an exhaust system configured to
2 regulate the exhaust flow rate of the gas.

1 14. The device of claim 11 wherein the gas distribution system comprises one or
2 more heating and cooling elements.

1 15. The device of claim 12 wherein the gas distribution system and the
2 temperature control element can be adjusted to different temperatures in order to vary
3 the temperature gradient within the device.

1 16. A method of conditioning a wafer having a first and a second side within a
2 chamber, the method comprising:

3 heating or cooling the wafer from the first side;

4 heating or cooling the wafer from the second side;

5 applying gas to the first side of the wafer, the gas distributed through a
6 plurality of passages such that the gas flow is substantially laminar.

1 17. The method of claim 16 further comprising heating or cooling the gas such
2 that the gas is heated or cooled to substantially the same temperature as the first side
3 of the wafer.

1 18. A post exposure bake chamber comprising:

2 a first heating plate;

3 a second heating plate;

4 the first and second heating plates configured to heat a wafer placed between
5 the plates, the wafer spaced from the first and second heating plates by proximity
6 pins.

1 19. The post exposure bake chamber of claim 18 further comprising a flow control
2 system having distributed gas flow paths and one or more flow control elements
3 regulating the gas flow rate through the gas flow paths.

1 20. The post exposure bake chamber of claim 19 wherein the flow control system
2 is in contact with the first heating plate such that the gas is heated by the first heating
3 plate.

1 21. The post exposure bake chamber of claim 19 wherein the gas passes from the
2 flow control system through passages in the first heating plate to the wafer.

1 22. The post exposure bake chamber of claim 19 wherein the flow control system
2 comprises a flow channel plate, the one or more flow control elements formed in the
3 flow channel plate.

1 23. A wafer conditioning chamber comprising:
2 a first means for changing the temperature of the wafer at a first side of the
3 wafer;
4 a second means for changing the temperature of the wafer at a second side of
5 the wafer; and
6 a gas distribution means for distributing a gas at a controlled flow rate at a
7 plurality of locations upon the first or second side of the wafer.

1 24. The wafer conditioning chamber of claim 23 wherein the gas temperature is
2 manipulated by the first or second means for changing the temperature of the wafer.

1 25. The wafer conditioning chamber of claim 24 wherein the gas distribution
2 means comprises flow control means for controlling the flow rate of the gas.

1 26. A system for varying the temperature of a wafer comprising:
2 a first temperature altering device;
3 a second temperature altering device, the wafer located between the first and
4 second temperature altering devices; and
5 an enclosure surrounding the first and second temperature altering devices and
6 the wafer, the enclosure comprising a gas input and output, the gas flowing from the
7 input past the wafer and to the output,
8 the system operable to vary a rate of closure of any of the first or second
9 temperature altering devices or the enclosure to adjust the temperature of the wafer.

1 27. The system of claim 26 wherein the system is further operable to vary a rate of
2 change of the temperature of the wafer by adjusting the rate of closure.

1 28. The system of claim 26 wherein the enclosure comprises an upper portion and
2 a lower portion, and wherein the system is operable to vary a rate of closure of the
3 upper or lower portion.

1 29. A device for controlling the temperature of a wafer within an enclosure having
2 a first and second enclosing structures, the device comprising:
3 a temperature control element; and
4 a gas distribution system configured to distribute gas at different points about
5 a surface of the wafer, the gas distribution system comprising a plurality of flow
6 paths, and a laminar flow element,
7 wherein the wafer is located between the gas distribution system and the
8 temperature control element, and
9 wherein the device is operable to adjust the rate of opening and closure of the
10 enclosure by varying one or more rates of movement of the first or second enclosing
11 structures.